

REMARKS

In the Office Action mailed February 25, 2005, all the claims were rejected under 35 USC § 103(a) based upon a combination of two or more references including US Patent No. 6,798,044 (Joshi) and a published application US 2002/0113305 (Huang). Claim 2 was rejected based upon those two taken with US 2003/089248 (Estacio). Claims 5 and 6 were rejected based on those two combined with US 6,476,481 (Woodworth et al.). Claim 2, 3 and 5 were rejected under 35 USC § 112, second paragraph, as being indefinite based upon grammatical mistakes.

Claims 9-15 are new. Independent claims 9, 12 and 14 are broader than prior independent claim 1. These new claims are added in view of the examination report and the prior art references which do not show the broader aspects of the invention.

This amendment corrects the grammatical errors in the claims and the following remarks will show that the claims are patentable over the art of record.

The claimed multi flip-chip module is not shown or suggested by the Joshi and Huang. The invention uses two different connections whereas each reference relies upon only type of connection. When the two references are combined consistent with their respective disclosures, the resulting combination does not read on the claims. The rejection is clearly erroneous in its interpretation of Huang and the Huang reference teaches away from the claimed invention.

The claimed invention provides for a lead frame with a die pad that holds two dies, one on each surface of the die pad, by using *different* bonding/mounting connections: a wire bonded connection for one die and a flip chip mounting for the other die. Stated another way, the dies have different electrical and mechanical connections to the external world. In sharp contrast, Huang and Joshi show the *same* connections for both dies. Huang uses only one technique (wire bonding) for both dies and Joshi uses only one technique (flip chip mounting) for both dies. Only the invention shows different connection techniques in one package.

The claimed invention has one die that is entirely encapsulated and has no exposed surface and another with one exposed surface. In sharp contrast, the two dies

of Huang are both entirely encapsulated, neither has an exposed surface; in Joshi each die has an exposed surface and neither is entirely encapsulated.

The references show using one technique to connect both dies. One skilled in the art would be led to select wire bonding or flip chip mounting for both dies. There is no disclosure in either reference to mix connection types. Huang has no embodiments with exposed surfaces that could be flip chip mounted. None of his surfaced mounted devices provides for the required exposed surface that is essential to flip chip mounting.

Joshi has other differences compared to the invention. Joshi exposes surfaces of both devices on both sides of the package. As such, each exposed surface 20, 21 must be connected to a printed circuit board. That requires at least two boards because the entire exposed surface must be soldered and the two exposed surfaces are spaced apart from each other. One board is inadequate for Joshi. In contrast, one board is sufficient for the invention.

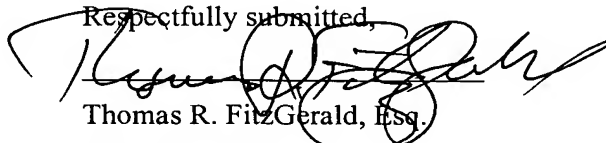
The invention solves the problems of both prior art references by using different connection techniques for the two die. Wire bonded dies are fully encapsulated, have no exposed surface, and thus are normally incompatible with flip chip packaging. The examiner understands that flip chip packaging (Joshi) is denser than surface mount packaging (Huang) and fully enclosed die could be flip chip mounted. The invention solves this problem. With the wire bonded device on the top, all its terminals may be electrically and mechanically connected to the external world via wire bonding and fully encapsulated without exposing any surface of the device. As such, the invention achieves a result not shown or suggested by the art of record: a multi chip packaging with flip chip features and a wire bonded fully encapsulated device.

The disclosure of Huang teaches away from the claimed combination. The claimed combination mounts two dies on the same die pad of one lead frame. In sharp contrast, Huang requires two lead frames, each with its own die pad. If one followed Huang and combined Huang and Joshi, then one would use two die pads and two lead frames. It is clearly erroneous to ignore the dual lead frame and dual die pads of Huang when Huang teaches that they are central to his patent. Moreover, Huang, in his background, expressly criticizes attempts by others to use only one lead frame and one die pad as provided in the subject invention.

Claims 9-15 are new. After reviewing the art applied to the claims, it appears that Applicants' invention is likely broader in scope than the claims originally filed. The same reasons given above for claims 1-6 apply equally to new claims 9-15. The new claims rely on the differences between the connections made to the two dies.

Having thus distinguished the claimed invention from the art of record, reconsideration and allowance are respectfully requested.

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Respectfully submitted,

Thomas R. FitzGerald, Esq.
Reg. No .26,730

Thomas R. FitzGerald, Attorney
16 E. Main Street, Suite 210
Rochester, New York 14614
Telephone: (585) 454-2250
Fax: (585) 454-6364